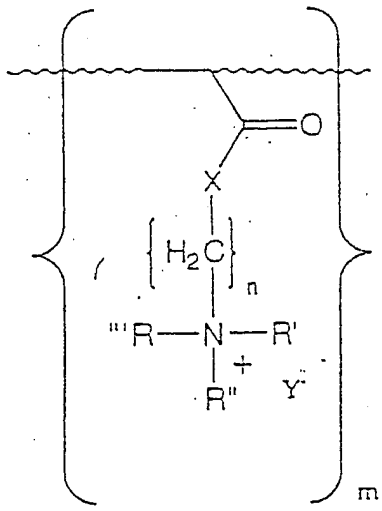
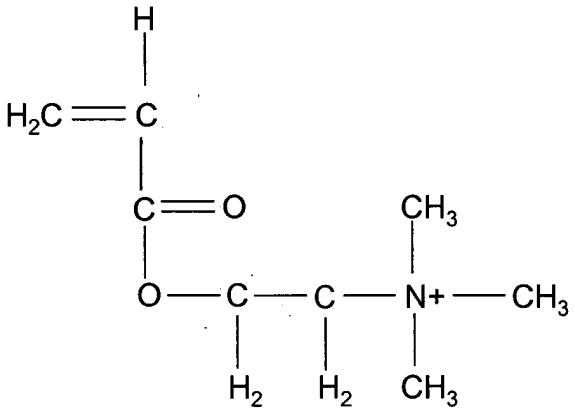
antimicrobial thermoplastic hydrogels. These antimicrobial hydrogels have an essentially non-leachable antimicrobial compound ionically bonded to a thermoplastic. (See Abstract). In particular, the hydrogel comprises at least one vinyl addition interpolymer having pendant alkali metal carboxylate groups or salts thereof, and at least one essentially non-leachable antimicrobial compound ionically bonded to substantially all of the pendant carboxylate groups. (See Abstract and pg. 4, lines 4-13). In one embodiment, Vaughn, et al. notes that the polymer can be formed by first reacting a base and acrylic acid to form a cation acrylate (e.g., sodium acrylate, potassium acrylate, or ammonium acrylate). (pgs. 6-7). Thereafter, the cation acrylate is contacted with an aqueous antimicrobial solution comprising at least one quaternary ammonium salt. After a sufficient period of time, the salt ionically bonds to the cation acrylate site, thereby discharging the cation and forming the antimicrobial hydrogel. (pg. 7).

On the other hand, claims 1, 11, and 23 generally require a polymer having the following formula:



wherein n is an integer of 2 to 3; R', R" and R"' are independently selected from the group consisting of H, $C_1$ to $C_{16}$ alkyl, aryl, arylamine, alkylamine, alkaryl and aralkyl; X is selected from the group consisting of O and NH; $Y^-$ is an acceptable anionic counterion to the $N^+$ of the quaternary amine and m is an integer greater than 50,000.

As can be seen, the quaternary amine functional group of the polymer is covalently bonded to "X", which is either O or NH. For instance, in one embodiment, such a polymer is obtained by polymerizing acryloyloxyethyltrimethyl ammonium chloride, which has the following structure (Appl pg. 13, lines 10-16):



In this embodiment, the ammonium group of the monomer is covalently bonded to the oxygen atom through an ethyl linkage. By being covalently bonded in the manner described above, the remaining polymer can retain an overall cationic charge. Without being limited in theory, it is believed that this cationic charge can enable the hydrogel to accelerate healing because blood clotting is promoted due to the neutralization of polyanionic clotting inhibitors by the cationic polymer. (See e.g., Appl. pg. 9, lines 13-17).

To the contrary, the polymer of Vaughn, et al. is formed by ionically bonding a quaternary ammonium salt to an acrylate (e.g., cationic acrylate). For instance, when a cation acrylate is used as a monomer in Vaughn, et al., the ammonium salt displaces the cation at the pendant acrylic acid groups to form the hydrogel. As a result, it is believed that the resulting polymer of Vaughn, et al. would not possess the same cationic charge required by the present claims. Specifically, it is believed that the ionic attraction between the cationic quaternary ammonium compound and the anionic pendant carboxylate groups of Vaughn, et al. would result in a charge that is relatively neutral in comparison to the cationic charge obtained using the polymer of the present claims. Accordingly, for at least the reasons set forth above, Applicants respectfully submit that Vaughn, et al. fails to disclose or suggest one or more limitations of the present claims.

As noted above, Jevne, et al. was also combined with Vaughn, et al. to render obvious the present claims. Jevne, et al. is directed to a polymeric, amphoteric hydrogel that has a first polymer repeating acid group and a second polymer repeating base group. (Col 2, lines 49-58). The polymeric hydrogel of Jevne, et al. can be made by combining the individual acidic and basic monomers followed by copolymerization, or by polymerizing the monomers individually and then blending the resulting polymers. (Col 3, lines 36-47). As a result of having both acid and base groups in the polymeric structure of the amphoteric hydrogel of Jevne, et al., a zwitterion structure is said to form in which the ions of the hydrogel are substantially nonmobile. (See e.g., Col 5,

lines 6-9).

On the other hand, independent claims 1, 11, and 23 require a hydrogel that is cationic and that contains an inherently antimicrobial quaternary amine acrylate polymer. For instance, as stated in the present specification, the cationic hydrogels of the present invention are able to absorb significant amounts of fluid or exudate from a wound or other skin surface abrasion. (pg. 10, lines 1-4). In addition, the cationic hydrogels can also maintain a wound in a moist condition that facilitates healing and enhances the cosmetic appearance of the wound as it heals. (pg. 10, lines 12-14). Furthermore, the inherent antimicrobial properties of the present hydrogel can also maintain or promote sterility and enhance healing when used on a wound.

Nowhere does Jevne, et al. disclose or suggest the use of the cationic hydrogel of the present claims. To the contrary, Jevne, et al. specifically requires the use of an amphoteric hydrogel to inhibit the migration of ions. (See e.g., Col 2, lines 23-28 and 48-58). In fact, Jevne, et al. teaches away from the use of such cationic hydrogels. For example, Jevne, et al. describes one known biopolymer that is derived from an anionic protein electrolyte component and a cationic biopolymer selected from glucosaminoglycan and collagen. (Col 2, lines 8-14). Jevne, et al. states that such known hydrogels have significant disadvantages in some applications due to the ionic structure of the adhesive. (Col 2, lines 15-22). As such, for at least the reasons set forth above, Applicants respectfully submit that independent claims 1, 11, and 23 patentably define over Jevne, et al.

In addition, the above-cited references, along with U.S. Patent No. 3,871,376 to Kozak, were also cited to reject dependent claims 2-10, 12-22, and 24-36. Applicants respectfully submit, however, that at least for the reasons indicated above relating to corresponding independent claims 1, 11, and 23, claims 2-10, 12-22, and 24-36 patentably define over the references cited. Nevertheless, Applicants also note that the patentability of dependent claims 2-10, 12-22, and 24-36 certainly does not hinge on the patentability of independent claims 1, 11, and 23. In particular, these claims possess features that are independently patentable, regardless of the patentably of claims 1, 11, and 23.

Thus, for at least the reasons set forth above, Applicants respectfully submit that the present claims patentably define over all of the prior art of record and meets all of the requirements of 35 U.S.C. §112. It is believed that the present application is in complete condition for allowance and favorable action, therefore, is respectfully requested. Examiner Yu is invited and encouraged to telephone the undersigned, however, should any issues remain after consideration of this response.

Please charge any additional fees required by this Response to Deposit Account No. 04-1403.

Respectfully submitted,

DORITY & MANNING, P.A.

Jason W. Johnston
Registration No. 45,675

DORITY & MANNING, P.A.
P.O. Box 1449
Greenville, SC 29602-1449
Phone: (864) 271-1592
Fax: (864) 271-7342

Date: 2/27/02